

DRIVABLE GRASS®

Permeable, Flexible and Plantable Concrete Pavement System



SOIL RETENTION

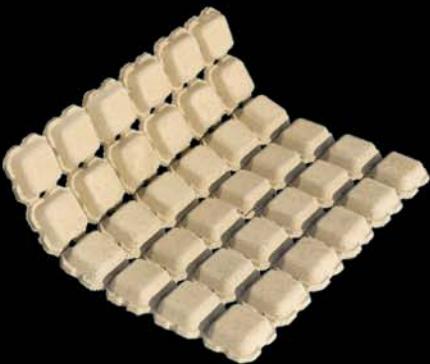
Plantable concrete systems®



DRIVABLE GRASS® is a permeable, flexible and plantable concrete pavement system that is environmentally friendly, aesthetically pleasing, and an alternative to poured concrete, asphalt and interlocking concrete pavers. **DRIVABLE GRASS®** is designed with an engineered polymer grid, which allows the product to be flexible and conform to irregular ground surface contours along pre-defined linear grooves, while providing the intended structural support.

DRIVABLE GRASS® facilitates the growth of a continuous root system below the product in the bedding course, promoting healthy turf while minimizing moisture evaporation. The distinctive thin profile and bearing properties of **DRIVABLE GRASS®** enable superior root penetration into the underlying bedding course, establishing a cohesive root zone below the mats.

This unique product, whether planted or non-planted, is a solution for multiple applications of low impact development strategies ranging from commercial parking lots to drainage swales and practical DIY applications. **DRIVABLE GRASS®** is a great solution for many existing and emerging government regulations, codes and requirements. Contractors, specifiers, local and state municipalities can incorporate **DRIVABLE GRASS®** on their projects to enhance water quality, mitigate stormwater runoff, increase greenspace, and reduce heat island effect.



DRIVABLE GRASS®
The perfect paving choice for a wide variety of applications.



PARKING LOTS



DRIVEWAYS



GOLF COURSES



RV PARKING



PATHWAYS



BOAT RAMPS



FIRE LANES



DRAINAGE SWALES

OTHER APPLICATIONS INCLUDE:

Maintenance Yards, RV Parks, Slope Armor, Trickle Channels, Stream Bank Installation, Culvert Outlets, Helicopter Pads, Courtyards, Patios, Pet Digging Control, Trash Can Pads, Road Shoulders, Green Roofs.



Strength and Durability!

"Soil Retention's **DRIVABLE GRASS**® product was just the solution we were looking for. Providing the strength and durability we require while at the same time solving our run off water issue."

- *Former Oceanside Fire Chief
Oceanside, CA*



Photo Courtesy of Pitzer College

TESTED AND PROVEN!

Emergency access can be built in a low-impact, yet dependable manner. Grass paving has become a popular application for emergency vehicle access with many benefits; while blending them into the landscape, and maximizing buildable area, grass paving does not sacrifice green-space.

In recognition of the loading requirements for heavy vehicles such as fire trucks, Soil Retention elected to test **DRIVABLE GRASS®** in a heavily used application. The product was installed at a fire station truck wash area that was retrofitted due to requirements of the regional water quality control board. To date thousands of passes have been done and the installation has been in place successfully since 2006 without maintenance. Since there are no common industry testing requirements for fire truck loading, Soil Retention wanted to prove that the flexibility and strength of **DRIVABLE GRASS®** are comparable to conventional asphalt and concrete.



PLANTED PARKING



Designed for daily use!

DRIVABLE GRASS® is the premier plantable paving system for daily parking. **DRIVABLE GRASS®** has bearing properties similar to concrete and asphalt while the void spaces are able to prohibit compaction within the root zone. **DRIVABLE GRASS®** is a wet cast concrete mat with an engineered grid cast inside. Individual pads are intended to flex at the joints and the grid is designed to allow for long term settlements.

As demand grows for alternative parking options to conventional asphalt and concrete surfaces, **DRIVABLE GRASS®** is an ideal paving choice for these parking areas. Using vegetated infills has an overwhelming effect on the environment and ecology of the project. Another advantage is that valuable space can now be considered multifunctional, creating a better aesthetic appeal and often a better neighbor without sacrificing buildable land. Additionally, a grassed driving surface reduces glare and absorbs noise, while adding to green open space.





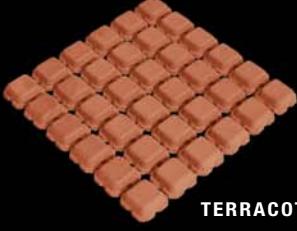
NON-PLANTED PARKING



BUFF/TAN



GREY



TERRACOTTA

If planting is not an option based on existing conditions, design considerations or regulatory constraints, **DRIVABLE GRASS®** can be used with non-planted infill choices. Installed with non-planted infills such as decomposed granite, angular rock up to 3/8" minus, or artificial turf, the system can provide the same durable solution as a planted application. Staggering of the mats and staking are considerations for non-planted infills. Visit our website at www.soilretention.com for detailed specifications and drawings.



Alternative Planting And Infill Options



DECOMPOSED GRANITE INFILL



AGGREGATE INFILL



AGGREGATE INFILL / TURF



NATIVE GROUNDCOVER



AGGREGATE INFILL



ARTIFICIAL TURF

DRIVABLE GRASS® can be used with a variety of alternative planting and infill options, whether the reason is an environmental concern, aesthetic choice, regional climate response or regulatory constraint.

Alternative infills divide into two classes: alternative planting and non-planted materials. Alternative plants for **DRIVABLE GRASS®** include ground covers and non-turf grasses. With alternative plants, the installation profile remains the same as with turf grasses; a mix of sand and granular compost above and below the mats act as a rooting zone.

In some cases the plant material can be seeded like turf grass, while others may require hydroseeding, hand installation of plant plugs in the void spaces between the mat pads or even the periodic removal of individual pads for installation of plants up to a 4" pot size. Watering requirements depend on the climate and plant material selected.

Non-planted infills can be selected for their specific properties and intended use. Popular choices include: crushed rock, decomposed granite, sand, and artificial turf. A thin layer of sand is placed for leveling below the **DRIVABLE GRASS®** mats, and the selected infill is broomed-in just below the surface of the mat. While a decorative rock can be a desired solution for a patio, angular rock up to 3/8" is recommended for driving applications.



STONE



SAND



GROUND COVER



ARTIFICIAL GRASS





Where reduced water consumption is a consideration, DRIVABLE GRASS® can be installed using alternative planting and infill options.



DRIVABLE GRASS® enables storm water to infiltrate into the underlying permeable base and exfiltrate to the native subgrade. When using open graded aggregates with a void space of 30-40% as base material, significant amounts of water can be collected and stored for reuse as irrigation through rain water harvesting techniques. Storm water is filtered by the turf grass and the biosystem that naturally occurs within the root zone soil. By employing this type of bioretention in permeable parking stalls, permeable swales and other rain garden strategies, **DRIVABLE GRASS®** can eliminate the need for storm drains, plastic boxes and conventional detention basins, offering a real cost value to projects.

Storm Water Properties

Property	Value
Run off Coefficient (C)	
Aggregate Infill	0.1-0.6 *
Grass Infill	0-0.3 **
Infiltration Rate (K in/hr)	
Aggregate Infill	4-40 *
Grass Infill	2-4 **

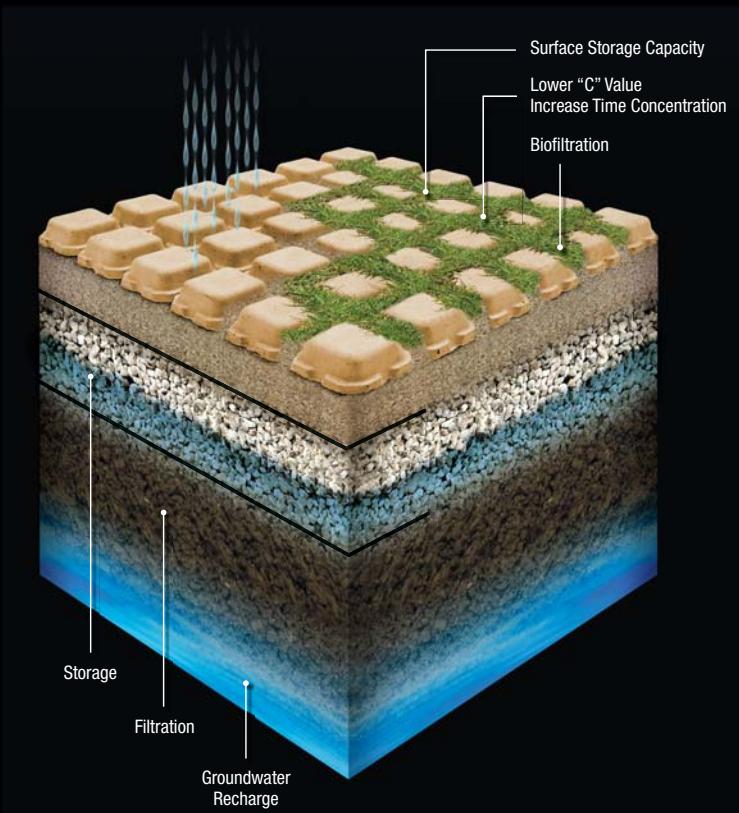
NOTES: *Based on specifications **Based on amount and type of grass used

Hydraulic Performance Testing per Colorado State University

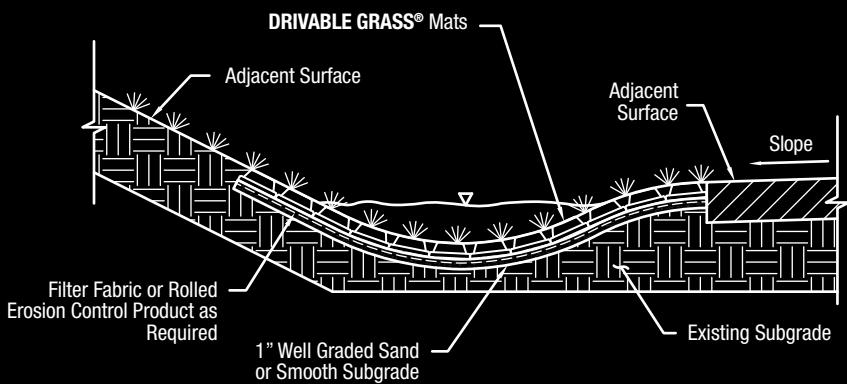
Velocity Limit without Stakes	6-7.4 ft/sec
Velocity Limits with Stakes	9.9 ft/sec
Maximum Stable Shear Stress	3.0 psf
Mannings Roughness Factor (n)	0.025 – 0.039

All testing was performed without vegetation. Drivable Grass® can be planted or left un-vegetated. Selection of underlying fabric will be based on application, climate, and long-term performance requirements. Occasional staking and plant establishment will increase overall performance. See our website for complete testing report and design specifications.

Replace Conventional detention basins and gain more usable space!



Typical Drainage Swale Detail



Erosion Control and Drainage Solutions

BIO SWALES

ROAD SHOULDERS

ROADSIDE SWALES

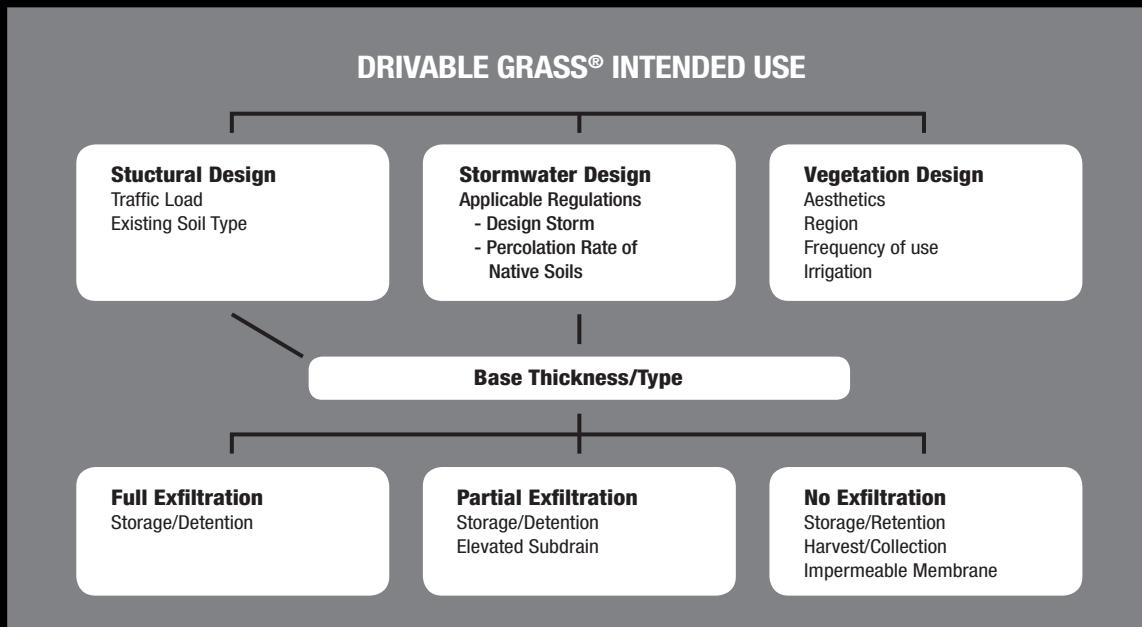
INFILTRATION BASINS

DITCHES

Compared to traditional concrete curb and gutter, **DRIVABLE GRASS®** used as drainage swales and small channels allow infiltration, slow down run-off, and provide water to surrounding landscape and aquifers. **DRIVABLE GRASS®** is a simple solution to linear projects that are required to comply with state and federal laws on reducing and eliminating run-off in existing retrofit and future projects.



Design Considerations



DRIVABLE GRASS® Structural Design Guidelines

Subgrade	Gravels/Clean Sand	Sands	Clay/Silt
USCS Classification	GW - Well Graded Gravels GP - Poorly Graded Gravels GM - Silty Gravels GC - Clayey Gravels SW - Well Graded Sands SP - Poorly Graded Sands	SM - Silty Sands SC - Clayey Sands	ML - Inorganic Silts of Low Plasticity CL - Inorganic Clays of Low Plasticity MH - Inorganic Silts of High Plasticity CH - Inorganic Clays of High Plasticity
Typical R-Value Range	30-70	10-40	5-15
Typical CBR Value Range	40-80	10-40	3-15
Application	Base Thickness (in.)		
Firelane	6-8	6-10	10-12
Parking Lots Stalls	4-8	6-10	8-12
Parking Lots Traveled Way	6-12	8-14	12-16
Residential Driveways	0-4	2-6	6-10
Walkways	0	0	0-4

NOTE: These recommendations are to be used as a general guide. Refer to your Civil or Geotechnical engineer for actual base thickness design. Recommendations were generated using Crushed Miscellaneous Base (CMB) as the typical base material, other types of base material can be used, CMB has a gravel factor of GF=1.1. Actual base thickness will be dependant on the Traffic Index (TI) and the Gravel Factor (GF) generated by the Engineer of Record for the project based on site specific conditions. Estimated Traffic Index (TI) values that were used for the generation of the recommended base thickness provided in the table are: Firelane TI=4.0, Parking stall TI=4.0, Traveled Way TI=5.5. Filter Fabric and subdrains may be required for soils with a low value of permeability and strength. Soils not recommended for use as subgrade material are the OL, OH, PT type soils. Storm water requirements may ultimately govern the design of the base thickness.

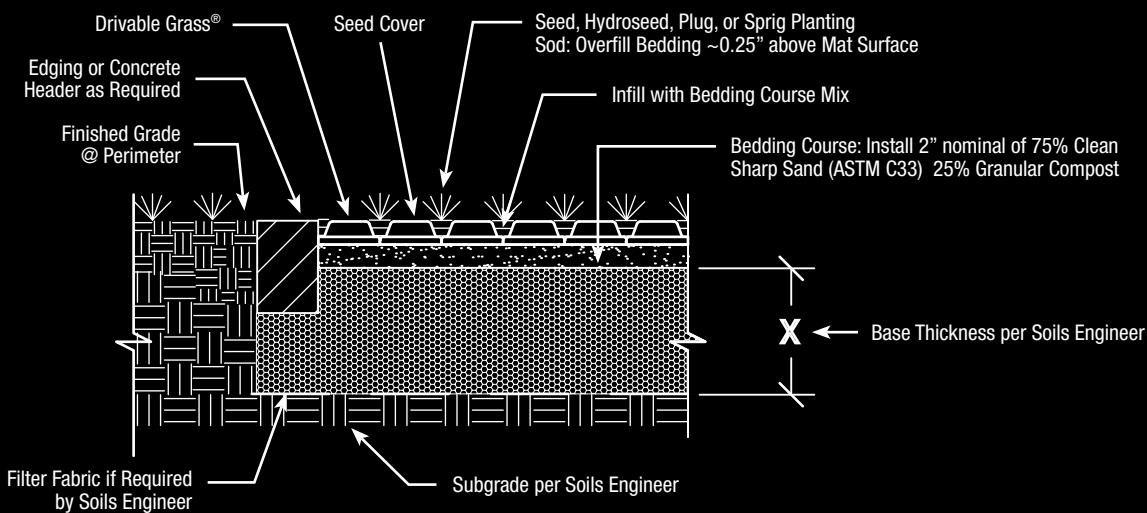
Typical Cross Section for Planting



Property	Value
Nominal Area LxWxH	24"X 24" X 1.5"
Gross Area of Each Mat	4 S.F.
Concrete Strength	5000 Psi
Weight of Each Mat	45 Lbs
Flexibility Min. Radius of Curvature	12 In
Plantable Area	60% / 100% for Sod
Concrete Surface Area	40%
Concrete Bearing Area	88%
Mats Per Pallet	60
Area Covered Per Pallet	240 S.F.
Color*	Buff/Tan, Grey, Terracotta

* Other Colors Available For Special Order

Typical Commercial DRIVABLE GRASS® Detail



Installation Overview

Step 1 - Subgrade Preparation

- Excavate and prepare subgrade as specified
- Install filter fabric, if required



Step 2 - Install Base Materials, Edge Restraints, Sub-Drains and Irrigation as required

Step 3 - Install Bedding Layer (see Typical Commercial Detail)

- Compact to get a uniform level surface before placing DRIVABLE GRASS® mats
 - Install specified bedding mix makeup per manufacturers recommendations
- *Non-planted: add a thin layer of sand for leveling*



Step 4 - Install the DRIVABLE GRASS® Mats

- Place the mats butted up against each other
- Grid can be cut with utility knife or chisel. Mats can be cut with masonry blade
- Lightly compact before infill to set mat into bedding course layer
- *Non-planted: staking may be required based on application and infill material*



Step 5 - Infill (and Plant)

- Infill with same bedding mix makeup as bedding layer
 - Seed: Broom in to $\frac{1}{4}$ " off top of mat surface before applying seed.
 - Use seed cover and keep moist to promote germination
 - Sod: Overfill mats $\frac{1}{4}$ " above surface before laying sod, then roll to set
 - Hydroseed: Mix seed with hydromulch and apply as specified
- *Non-planted: Broom in specified infill below mat surface. Overfill is not recommended.*



Step 6 - Plant Establishment

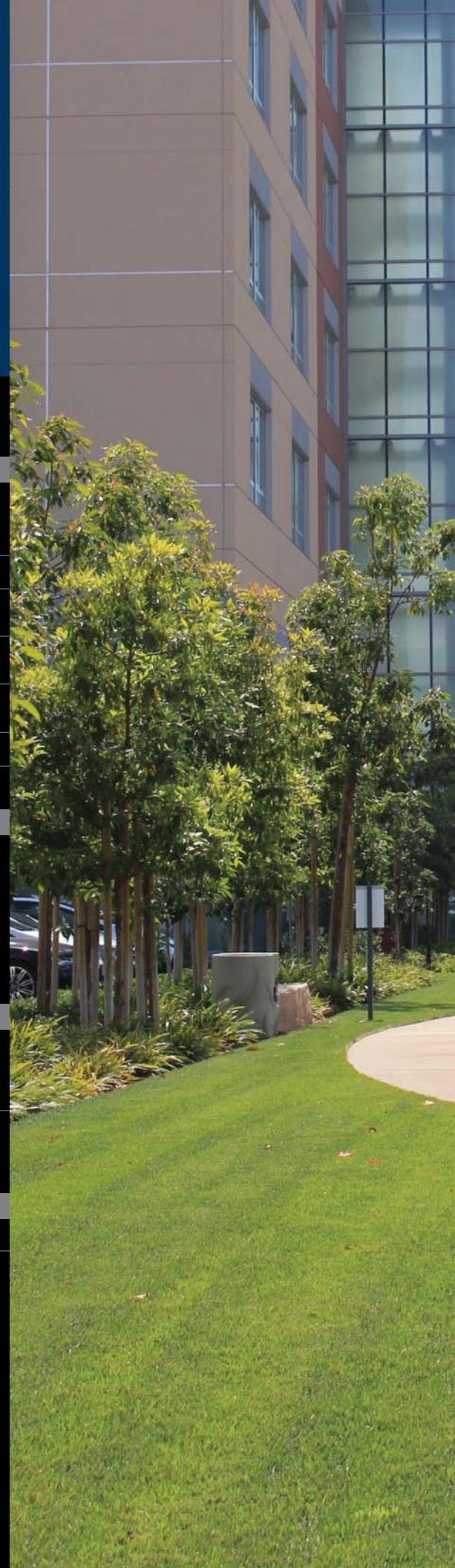
- Protect area until root system is established.
- Driving can typically begin after the second mowing.

**For complete Installation Instructions see our website
www.soilretention.com/drivable-grass/professional/**

LEED Credits and Potential Point Contributions



Section	Intent/Application	Example Uses	Credit	Points
Sustainable Sites				
Alternative Transportation	Parking Capacity	DRIVABLE GRASS® allows for overflow parking that would not count for excess of local zoning requirements	4.4	1
Site Development	Protect/Restore Habitat	Overflow Parking Stalls, Bioswale	5.1	1
Site Development	Maximize Open Spaces	Parking Stalls, Access Roads, Walkways /Pathways	5.2	1
Storm Water Design	Quantity Control	Bioswale, Trickle Channels, Parking Areas, Vegetated Roof	6.1	1
Storm Water Design	Quality Control Credit	Bioswale, Trickle Channels, Parking Areas, Vegetated Roof	6.2	1
Heat Island Effect	Non-Roof	Parking Areas and Access Roads	7.1	1
Heat Island Effect	Roof	Green Roof Pathways/Erosion Control	7.2	1
Water Efficiency				
Water Efficient Landscaping	Reduce by 50% or No Potable Water Use or Irrigation	Use as a permeable surface/filter to collect water which can then be used for landscaping Use with alternative infills or drought tolerant groundcovers or as part of a Xeriscape w/gravel infill for erosion control	1	2-4
Materials and Resources				
Recycled Content	10% / 20% (Post-Consumer + 1/2 Pre-Consumer)	45% Cement Replacement with Fly Ash in Concrete Mix <i>(inquire for regional availability)</i>	4	1-2
Regional Materials	10% / 20% Extracted Processed and Manufactured Regionally	We currently manufacture in several states. Please contact us for locations.	5	1-2
Innovation & Design Process				
Innovation in Design			1	1-5





BENEFITS

LOW IMPACT DEVELOPMENT (LID)

DRIVABLE GRASS® provides opportunities for storm water containment, biofiltration, infiltration and storage.

BEST MANAGEMENT PRACTICE (BMP)

Long term effective solutions such as armored bioswales and rain gardens.

LOWER RUNOFF COEFFICIENT "C"

Helps to reduce storm drain and inlet size.

BIOFILTRATION

Insects and microorganisms within the grass infill help to significantly break down pollutants in storm water.

PERMEABILITY

Reduces site runoff, promoting ground water recharge and onsite storage.

REDUCTION IN HEAT ISLAND EFFECT

Light color and grass surface reflects solar radiation helping to reduce regional heat gain.

COMPETITIVE ADVANTAGES

FLEXIBILITY WITHOUT MEMORY

Reinforcing grid and grooves in **DRIVABLE GRASS®** give it the ability to conform to uneven contours.

STRENGTH

Proven, real-life testing for extreme loading; not carefully crafted lab tests. Refer to our web site for printable reports.

DURABILITY

DRIVABLE GRASS® has a concrete compressive strength of 5,000 psi and low water absorption that limits wear and cracking.

WINTER CLIMATES

The design of **DRIVABLE GRASS®** allows it to flex with freeze/thaw cycles without cracking at the surface. Low moisture absorption and pad size/shape prevents cracking, spalling and catching edges. Snow melt infiltrates, but does not pond and re-freeze.

LESS EXCAVATION

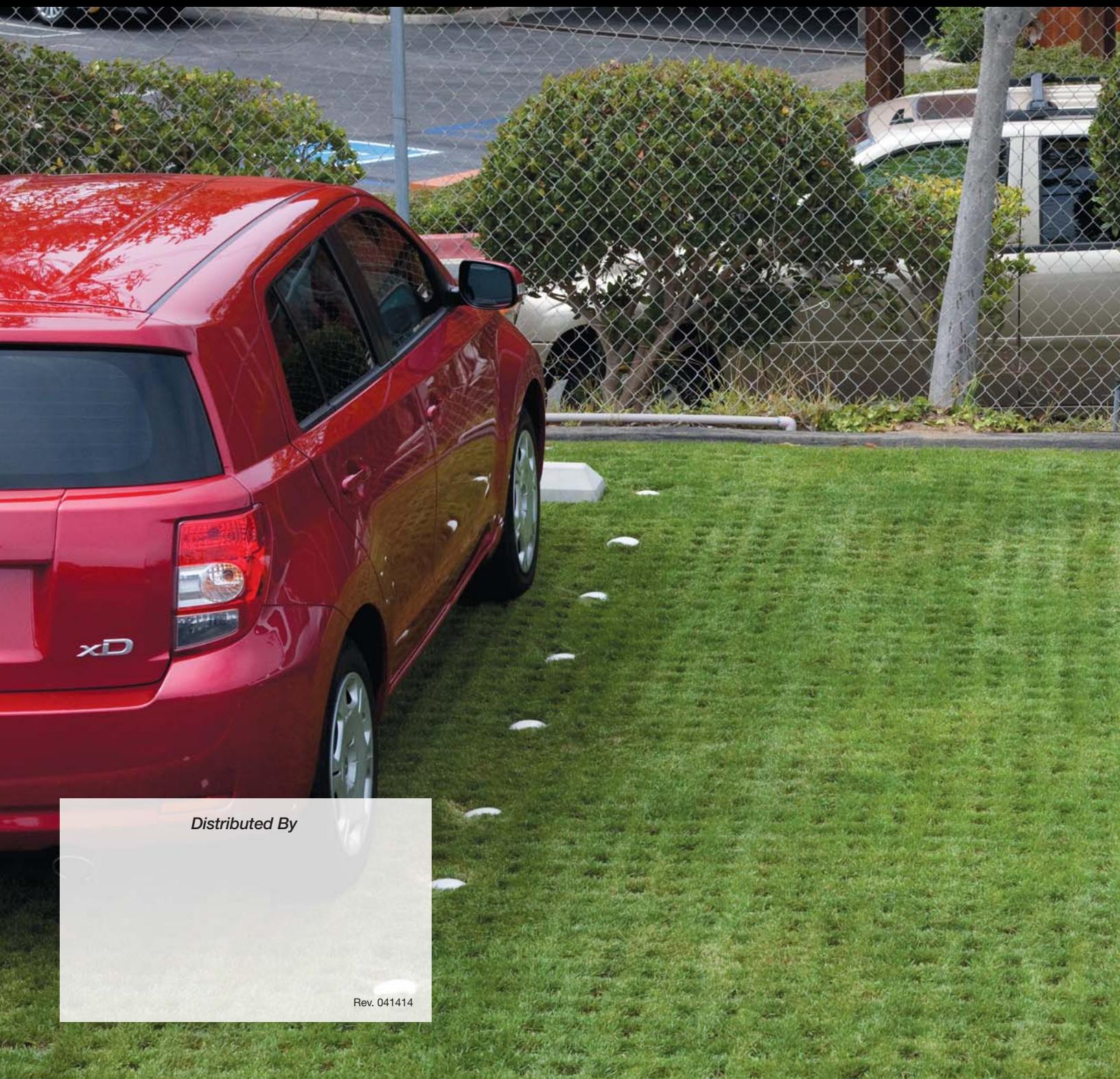
Requires less removal of sub-base than traditional pavers or thick blocks.

QUICK/EASY INSTALLATION

Installs in half the time of conventional pavers. Flexibility and design of the product offers significantly more forgiving placement compared to large rigid blocks.

ROOT PENETRATION

DRIVABLE GRASS® enables superior root penetration into the underlying bedding course, establishing a cohesive root zone below the mats.



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Other Products



 **SOIL RETENTION**
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(800) 346-7995